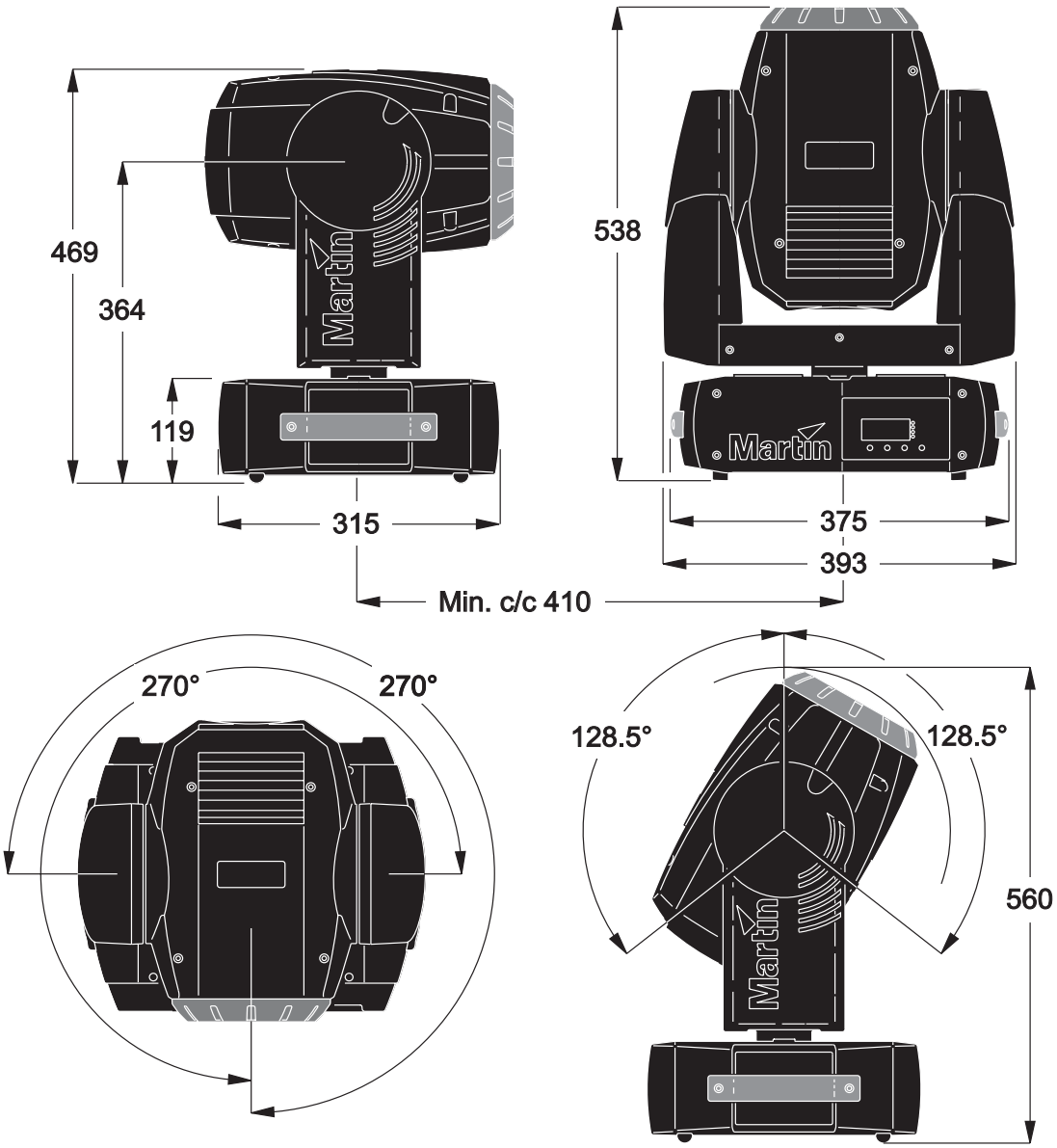
MAC 250 Wash™

user manual

Martin®

Dimensions

All measurements are expressed in millimeters



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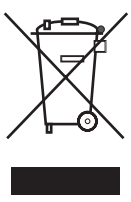

Disposing of this product

Martin™ products are supplied in compliance with Directive 2002/96/EC of the European Parliament and of the Council of the European Union on WEEE (Waste Electrical and Electronic Equipment), as amended by Directive 2003/108/EC, where applicable.

Help preserve the environment! Ensure that this product is recycled at the end of its life. Your supplier can give details of local arrangements for the disposal of Martin products.

Introduction

Thank you for selecting the Martin™ MAC 250 Wash™, a moving head wash light with a range of color-changing and control options and a 250 watt long-life discharge lamp. The MAC 250 Wash features a newly-designed glass reflector that gives extremely high light output.

Features

The MAC 250 Wash features:

- efficient, 3000 hour, 250 watt discharge lamp
- full CMY color mixing
- color wheel with six removable dichroic color filters including CTC, plus open position
- combined dimmer/shutter with full-range dimming and variable speed pulse and strobe effects
- Fresnel lens plus optional wide-angle lens
- 540° of pan and 257° of tilt
- user-installable firmware
- switchable power supply setting
- tilt locks for easier transport and service
- temperature-regulated cooling fans for quieter operation

For the latest firmware updates, documentation, and other information about this and all Martin Professional products, please visit the Martin website at http://www.martin.com

Comments or suggestions regarding this document may be e-mailed to service@martin.dk or posted to:

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Martin Professional A/S
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Denmark

Warning! ***Read the safety precautions in this manual before installing and operating the fixture.***

Safety information

Warning! ***This product is for professional use only. It is not for household or residential use.***

This product presents risks of lethal or severe injury due to fire and heat, electric shock, ultraviolet radiation, lamp explosion, and falls.

Read this manual before installing, powering or servicing the fixture, follow the safety precautions listed below and observe all warnings in this manual and printed on the fixture. If you have questions about how to operate the fixture safely, please contact your Martin supplier or call the Martin 24-hour service hotline on +45 8740 0000, or in the USA on 1-888-tech-180.

PROTECTION FROM ELECTRIC SHOCK

Warning! ***Always disconnect from mains supply before replacing the lamp.***

- Disconnect the fixture from AC power before removing or installing the lamp, fuses, or any part, and when not in use.
- Always ground (earth) the fixture electrically.

- Use only a source of AC power that complies with local building and electrical codes and has both overload and ground-fault (earth-fault) protection.
- Check that power supply settings match the local AC power before use.
- Do not expose the fixture to rain or moisture.
- Refer any service operation not described in this manual to a qualified technician.

PROTECTION FROM UV RADIATION AND LAMP EXPLOSION

- Do not operate the fixture with missing or damaged covers, shields, lenses or ultraviolet screens.
- Allow the fixture to cool for at least 45 minutes before opening it or removing the lamp. Protect your hands and eyes with gloves and safety glasses when handling lamps.
- Do not stare directly into the light. Never look at an exposed lamp while it is lit.
- Replace the lamp if it becomes thermally deformed, damaged, defective or worn out.
- Replace the lamp before usage exceeds the maximum service life.

PROTECTION FROM BURNS AND FIRE

Danger! ***Intense heat. Avoid contact by persons and materials.***

The exterior of the fixture can get very hot – up to 160° C (320° F). Allow the fixture to cool for at least 45 minutes before handling.

Prolonged exposure to an unshielded lamp can cause eye and skin burns.

- Never attempt to bypass the thermostatic switch or fuses. Always replace defective fuses with ones of the specified type and rating.
- Keep all combustible materials (for example fabric, wood, paper) at least 0.1 meter (4 inches) away from the fixture. Keep flammable materials well away from the fixture.
- Do not illuminate surfaces within 0.5 meters (20 inches) of the fixture.
- Provide a minimum clearance of 0.1 meters (4 inches) around fans and air vents.
- Never place filters or other materials over the lens.
- Do not modify the fixture or install other than genuine Martin parts.
- Do not operate the fixture if the ambient temperature (Ta) exceeds 40° C (104° F).

PROTECTION FROM INJURY DUE TO FALLS

- Do not lift or carry the fixture alone.
- When suspending the fixture, check that the structure can hold at least 10 times the weight of all installed devices.
- Check that all external covers and rigging hardware are securely fastened and use an approved means of secondary attachment such as a safety cable.
- Block access below the work area whenever installing or removing the fixture.

Setup

Unpacking

The MAC 250 Wash is supplied with:

- MSD 250/2 lamp (factory installed)
- 3-meter, 3-wire IEC power cable
- Wide-angle lens
- This user manual
- Two 1/4-turn T-brackets for mounting a clamp
- 5-meter, 3-pin shielded XLR control cable

The packing material or flightcase is carefully designed to protect the fixture during shipment - always use it to transport the fixture.

When installing the MAC 250 Wash, you may find it useful to lock the head in place using the tilt lock (see illustration).

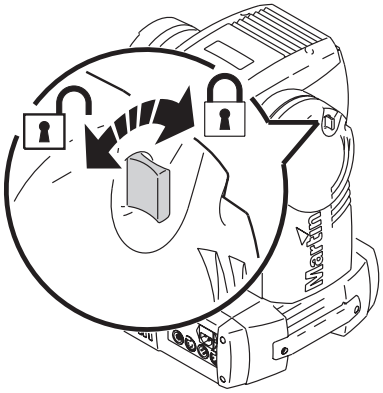


Figure 1: Tilt lock

For instructions on installing the wide-angle lens, see "*Installing the wide-angle lens*" on page 20.

AC power

Warning! ***For protection from electric shock, the fixture must be grounded (earthed). The power supply must have both overload and ground-fault (earth-fault) protection.***

Important! ***Check that power supply settings match the local AC power before use. The MAC 250 Wash is factory configured for 230 V / 50 Hz operation. If your AC power is different, the fixture must be configured for the local voltage and frequency. Always use the settings that are closest to your AC power. If no setting matches your local AC power exactly, select the next highest setting.***

CONFIGURING FOR LOCAL AC POWER

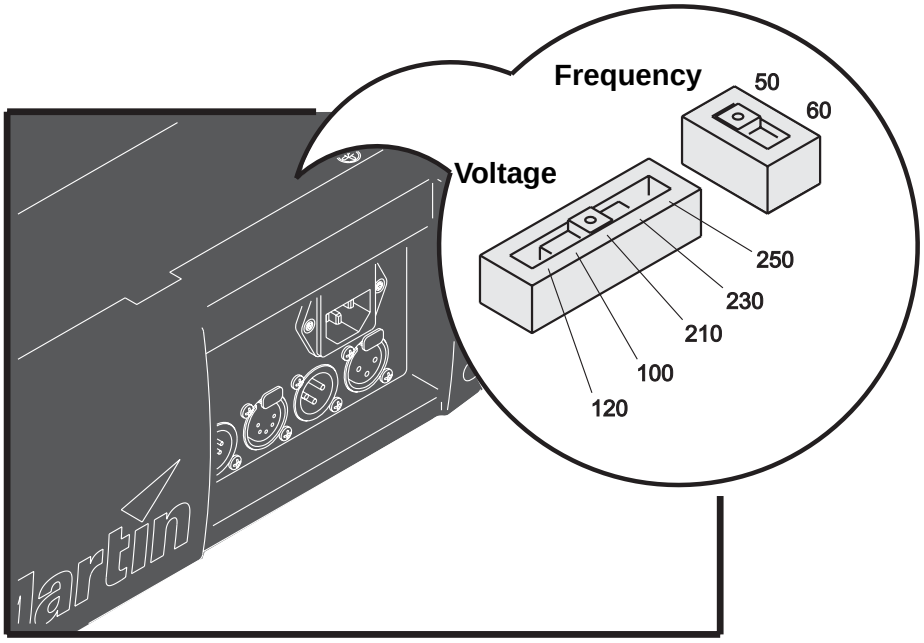


Figure 2: Power supply settings

1. Disconnect the fixture from power.
2. Remove the 2 Phillips screws in the access cover directly behind the power and data connectors (see Figure 2). Lift off the cover.
3. Locate the selection switches.
4. Move the voltage switch to the setting that most closely matches the local AC voltage. If your voltage falls between 2 settings, select the higher voltage. For example, if your AC voltage is 220 V, use the 230 V setting instead of 210 V.
5. Move the frequency switch to the setting that matches the local AC frequency: 50 or 60 Hz.
6. Replace the cover.

The main fuse is suitable for all AC power voltages and frequencies accepted by the fixture and does not need to be replaced when the fixture's settings are changed.

INSTALLING A PLUG ON THE POWER CABLE

The power cable must be fitted with a grounding-type cord cap (mains plug) that fits your power distribution system. Consult an electrician if you have any doubts about proper installation.

Following the cord cap manufacturer's instructions, connect the yellow and green wire to ground (earth), the brown wire to live, and the blue wire to neutral. The table below shows some pin identification schemes.

Wire	Pin	Marking	Screw color
brown	live	"L"	yellow or brass
blue	neutral	"N"	silver
yellow/green	ground	⏚	green

Table 1: Plug wiring

APPLYING POWER

Warning! ***All power cables must be undamaged and rated for the electrical requirements of all connected devices.***

Important! ***Do not connect the MAC 250 Wash to a dimmer system, as this can damage the fixture.***

1. Check that the power supply cable is undamaged and rated for the current requirements of all connected devices.

2. Plug the prepared power cable into the AC input socket and a grounded (earthed) AC power outlet.

Installation

LOCATION AND ORIENTATION

The MAC 250 Wash may be installed in any orientation. It can be fastened directly to a suitable surface, hung with a rigging clamp, or placed directly on a level surface.

For safe operation, install the MAC 250 Wash in a location where:

- there are no flammable materials nearby
- the fixture is at least 0.1 meters (4 inches) away from combustible materials
- there is at least 0.1 meters (4 inches) clearance around the fan and control panel.
- all surfaces to be illuminated are at least 0.5 meters (20 inches) away.
- the fixture is protected from rain and moisture

RIGGING OR MOUNTING THE MAC 250 WASH

Warning! ***Block access below the work area before proceeding.***

The MAC 250 Wash can be placed on stage or clamped to a truss in any orientation. The Fast-Lock system enables quick and easy fastening of the clamp brackets in 4 positions.

The MAC 250 Wash is supplied with two T-brackets to which 1 or 2 rigging clamps (not included) can be bolted. The T-brackets fasten to the base with 1/4-turn fasteners as shown in Figure 3.

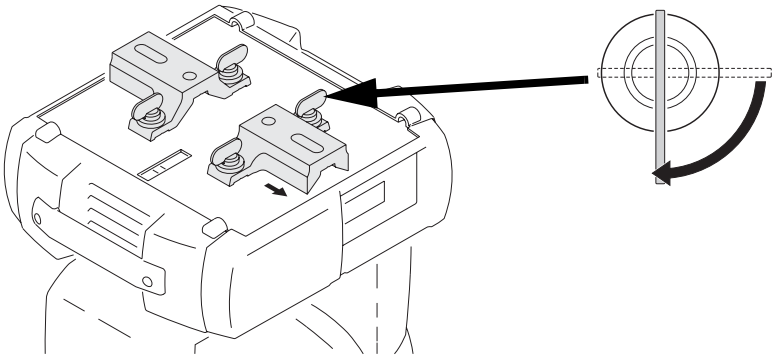


Figure 3: Clamp mounting bracket

Warning! ***Attach an approved safety cable to the attachment point provided in the base. Never use the carrying handles for secondary attachment.***

The 1/4-turn fasteners are locked only when turned fully clockwise.

1. Check that the clamps are in perfect condition and can bear at least 10 times the weight of the fixture. Bolt clamps to the bracket with a grade 8.8 (minimum) M12 bolt and lock nut, or as recommended by the clamp manufacturer, through the 13 mm holes in the T-bracket.
2. Align the T-bracket with any 2 key slots on the base. Insert both locking pins into the slots and turn both levers on the quarter-turn fasteners a full 1/4 turn clockwise to lock.
3. Check that the structure can bear at least 10 times the weight of all installed fixtures, clamps, cables, auxiliary equipment, etc.
4. Working from a stable platform, clamp the fixture to the structure.

5. Install a safety cable that can bear at least 10 times the weight of the fixture securely to the structure and anchor the cable to the dedicated attachment point on the base. The attachment point is designed to fit a carabiner clamp.

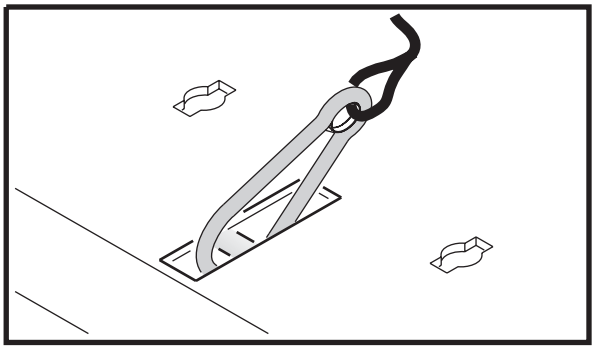


Figure 4: Safety cable attachment point

6. Check that there are no combustible materials or surfaces to be illuminated within 0.1 meter (4 inches) of the fixture, and that there are no flammable materials nearby.
7. Check that there is no possibility of heads or yokes colliding with other fixtures.

Connecting the DMX data link

The MAC 250 Wash has locking 3-pin and 5-pin XLR data input and output sockets that are wired for use with standard DMX devices with pin 1 to shield, pin 2 to cold (-) and pin 3 to hot (+).

Important! ***Never connect more than 1 data input and 1 data output to the fixture.***

1. Connect the controller's output to the fixture's data input.
2. Connect the output of the fixture closest to the controller to the input of the next fixture. If connecting a fixture with pin 3 hot to a fixture with reversed polarity (pin 3 cold), use a phase-reversing adaptor.
3. To terminate the link, insert a male 120 ohm XLR termination plug in the output of the last fixture.

3-pin to 3-pin phase-reversing adaptor	
Male	Female
1 —	— 1
2 —	— 2
3 —	— 3
P/N 11820006	

Male termination plug
Male XLR
1
2 — 120 Ω
3 —
P/N 91613017

TIPS FOR BUILDING A DMX LINK

- Use shielded twisted-pair cable designed for RS-485 devices: standard microphone cable cannot transmit DMX data reliably over long runs. For links up to 300 meters (1000 ft.) long, you can use 24 AWG, low capacitance, 85-150 ohm characteristic impedance, shielded cable with 1 or more twisted pairs. For runs up to 500 meters (1640 ft.), use 22 AWG cable. Use an amplifier if the DMX link exceeds 500 meters.
- Fixtures must be connected in a single line. Never use a "Y" connector to split the link. To split the DMX link into branches, use a splitter such as the Martin 4-Channel Opto-Isolated RS-485 Splitter/Amplifier.
- Do not overload the link. Up to 32 devices may be connected on a DMX link.
- Terminate the link by installing a termination plug in the output socket of the last fixture on the link. The termination plug is a male XLR connector with a 120 ohm, 0.25 watt resistor soldered between pins 2 and 3. This "soaks up" the control signal so it does not reflect back down the link and cause interference. If a splitter is used, terminate each branch of the link.

Control panel

You can set the MAC 250 Wash's DMX address, configure individual fixture settings (personality), read out data, and execute service utilities from the MAC 250 Wash's control panel. Settings can also be changed remotely via the DMX link with the Martin MP-2 uploader.

See also the control menu overview starting on page 28.

Menu navigation

The DMX address and any error messages are displayed after the fixture resets. To enter the menu, press [Menu]. Use the [Up] and [Down] keys to move within the menu. To select a function or submenu, press [Enter]. To escape a function or menu, press [Menu].

DMX Address selection

For independent control, each fixture must be assigned its own unique address and control channels. Two fixtures can share the same address if they are to respond identically: they will receive the same instructions and individual control will not be possible.

Two fixtures can be set up so that one pans as a mirror image of the other. To achieve this, assign the same DMX address to both fixtures, but use the settings in the control menu to invert the pan on one fixture (see "*Movement*" below).

SETTING THE DMX ADDRESS

1. Apply power to the MAC 250 Wash. Press [Menu] to enter the main menu.
2. Select ADDR using the [Up] and [Down] keys. Press [Enter].
3. Select an address (start channel) from 1 to 500 (for 16-bit mode) or 1 to 494 (for 16-bit Extended mode) using the [Up] and [Down] keys. Press [Enter]. Press [Menu] to return to the main menu.

16-bit and 16-bit Extended DMX Mode selection

The MAC 250 Wash has two DMX operating modes, 16-bit and 16-bit Extended. 16-bit mode uses 13 DMX channels and 16-bit Extended mode uses 19 DMX channels. 16-bit Extended mode provides more precise control of the dimmer, CMY color mixing, color filter, and frost effects. The MAC 250 Wash is supplied in 16-bit mode by default. DMX mode is changed using the PSET option in the fixture control menu (see "*Control menu*" on page 28).

SETTING THE DMX MODE

1. Apply power to the MAC 250 Wash. Press [Menu] to enter the main menu.
2. Select PSET using the [Up] and [Down] keys. Press [Enter].
3. Select 16BT for standard 16-bit mode, or 16EX for 16-bit Extended mode. Press [Enter].
4. Press [Menu] to return to the main menu.

Tailoring performance

MOVEMENT

The MAC 250 Wash provides various options for optimizing movement to suit different applications.

- PATI, the pan and tilt invert menu, allows you to swap the pan and tilt channels (SWAP→ON), invert pan movement (PINV→ON), and invert tilt movement (TINV→ON). These options can be useful in situations where you want some fixtures to mirror the performance of others with the same DMX address, or when fixtures are not oriented as programmed.
- PTSP, the pan/tilt speed menu, provides 2 settings: FAST and NORM (normal). The FAST setting provides maximum speed on controllers with high DMX output refresh rates (e.g. a recent PC and Martin LightJockey software). The NORM setting gives smoother, more precise movement with less powerful DMX controllers as well as the option of longer fade times, for theater use for example. Pan/tilt speed is set to FAST by default.
- EFSP, the effects speed menu, provides 3 settings: FAST, NORM and PTSS (Pan Tilt Speed Slave). The FAST and NORM settinsg are similar to PTSP (see above). If set to PTSS, effects speed copies the pan/tilt speed setting. This lets you set effects speed and pan/tilt speed with one instruction from your DMX controller.
- In the PERS (personality) menu, SCUT determines whether the color and gobo wheels scroll past open when changing positions. When set to ON, the wheels can “take a shortcut” and scroll through open when this is the shortest path to the next position. The wheels do not scroll past open when SCUT is set to OFF.

DISPLAY

The display menu (PERS→DISP) determines whether the display remains lit or not. Select ON to have the display remain permanently lit, Select 2 MN or 10MN to extinguish the display two minutes or ten minutes after the last key press.

To turn the display upside-down for easier reading, press [Up] and [Down] simultaneously.

The display intensity setting (PERS→DINT) controls display brightness. You can select AUTO for automatic dimming of the display using the built-in light sensor, or manually select an intensity level from 10 to 100.

LAMP POWER

There are two settings that modify lamp control: Automatic Lamp On (PERS→ALON) and DMX Lamp-Off (PERS→DLOF).

There are three options for automatic lamp control: ON, OFF, and DMX. When ALON is OFF, the lamp remains off until a lamp-on command is received from the controller. When ALON is ON, the lamp strikes automatically after the fixture is powered on. When ALON is set to DMX, the lamp strikes automatically when the fixture receives DMX data, and it douses automatically after 15 minutes without receiving DMX data. When ALON is set to either ON or DMX, lamp strike timing is determined by the fixture address to prevent all lamps from striking at once.

The DMX lamp-off setting affects how the lamp can be doused. When DLOF is ON, lamp power can be switched off by sending a DMX value from 248 to 255 on channel 1 for five seconds. When DLOF is OFF, the lamp-off command will not work unless special conditions are met (see the DMX protocol on page 26 for more details).

RESET

The fixture can be reset instantly from the controller if DMX reset (PERS→DRES) is set to ON. The reset value must be held for 5 seconds to reset if DMX reset is set to 5SEC. If DMX reset is OFF, resetting the fixture via DMX will not work unless special conditions are met. Refer to the DMX protocol.

DIMMER CURVE

In PERS→DICU, the dimmer can be set up to either open and close in a linear manner (DIM 1) or emulate the characteristics of a tungsten incandescent bulb (DIM2).

STUDIO MODE

If PERS→STUD is set to ON, pan, tilt and effects movement speed is set to NORM (normal) and fans are set to REG (temperature regulated operation) to give the quietest possible operation. Any existing speed

settings are overridden. The message SET BY STUDIO MODE scrolls in the display if you try to change speed settings via the PTSP or EFSP control options.

CMY BLACKOUT

- CMYB (CMY blackout) in the PERS menu makes the shutter blackout more effective. When set to ON, the CMY flags are activated 3 seconds after the shutter is closed. This absorbs any light output that escapes past the shutter. The CMY flags open automatically when the shutter is opened. Since this takes a fraction of a second longer, set CMYB to OFF for fastest snap open from blackout.

DEFAULT AND CUSTOM SETTINGS

The fixture can be reset to its factory default settings by selecting DFSE→FACT→LOAD.

Up to 3 custom settings can be saved and recalled. For example, to save custom setting 1, configure the fixture as desired, then select DFSE→CUS 1→SAVE. To recall this setting, select DFSE→CUS 1→LOAD.

Information readouts

POWER-ON HOURS

This readout can be used to track maintenance intervals. Read the total number of hours the fixture has been on since fabrication in INFO→TIME→HRS→TOTL, pressing [Enter] to display. Read the number of hours since the counter was last reset in INFO→TIME→HRS→RSET. Press [Enter] to display, and press [Up] for 5 seconds while displayed to reset.

LAMP HOURS

Read the total number of lamp hours since fabrication in INFO→TIME→L HR→TOTL, and the number of lamp hours since the counter was last reset in INFO→TIME→L HR→ RSET. Reset this counter after installing a new lamp. Press [Up] for 5 seconds while displayed to reset.

LAMP STRIKES

Read the total number of lamp strikes in INFO→TIME→L ST→TOTL, and the number of lamp strikes since the counter was last reset in INFO→TIME→L ST→RSET. Reset this counter when installing a new lamp. Press [Up] for 5 seconds while displayed to reset.

TEMPERATURE READOUTS

The temperature of the head can be read via INFO→TEMP→HEAD and the temperature of the base unit can be read via INFO→TEMP→BASE. Temperatures are in degrees Celsius.

FIRMWARE VERSION

INFO→VERS displays the firmware version number. The firmware version is also displayed briefly at startup.

Test and service utilities

DMX READOUT

The DMX log (DMXL) menu provides useful information for troubleshooting control problems.

RATE displays the DMX refresh rate in packets per second. Values lower than 10 or higher than 44 may result in erratic performance, especially when using tracking control.

QUAL displays the quality of the received DMX data as a percentage of packets received. Values much below 100 indicate interference, poor connections, or other problems with the DMX data link that are the most common cause of control problems.

STCO displays the DMX start code. Packets with a start code other than 0 may cause irregular performance.

The remaining readouts under DMXL display the DMX values received on each of the 13 channels available in both 16-bit and 16-bit Extended modes, from SHUT (shutter, channel 1) to EFSP (effect speed, channel 13). If the fixture does not behave as expected, reading the DMX values can help you troubleshoot the problem.

MANUAL CONTROL

The manual control menu (MAN) provides commands for resetting the fixture (RST), as well as striking the lamp (L ON), and dousing the lamp (LOFF). It also permits you to position and move individual effects.

EFFECTS TEST

The test sequence (TSEQ→RUN) runs through all effects to provide a quick check of fixture performance. Press [Menu] to stop the test.

FEEDBACK TOGGLE

Note that [Enter] must be pressed for 3 seconds to access settings in the UTIL menu.

Sensors monitor the positions of the pan/tilt systems and color wheel. If they detect an error, the effect resets on the fly. The shutter closes during resetting.

To ease service, for example, this feature can be disabled for pan/tilt by turning pan/tilt feedback off (UTIL→FEBA→OFF). The disabled pan/tilt feedback setting is saved when you exit the UTIL→FEBA menu.

Color wheel feedback can also be turned off (UTIL→EFFB→OFF). This setting is also saved when you exit the UTIL→EFFB menu.

ADJUSTMENT POSITIONS

The adjustment menu (UTIL→ADJ) provides commands for positioning the head and effects, as well as an effects position test sequence, during service and mechanical adjustment (see “*Adjustment submenu*” on page 31).

If the test sequence is run by selecting UTIL→ADJ→HEAD→TEST and an error is detected, the test aborts and a number flashes in the display to indicate which effect is out of position. Note this number and contact your Martin service center for advice.

EFFECT CALIBRATION

With the calibration menu (UTIL→CAL), effect positions can be fine-tuned with a software-defined offset value to compensate for small misalignments or differences between fixtures.

The default offset command (UTIL→DFOF) erases any offsets stored in memory.

CIRCUIT BOARD TEST

UTIL→PCBT executes a routine designed for testing the main circuit board. This function is for service use only.

FAN CONTROL

In UTIL→FANS, the cooling fans can be set to run at full speed or set to thermostatically regulated control. Running at full speed will give maximum lamp and component service life. Running at regulated speed gives quietest operation.

UPLOAD MODE

The upload mode command (UTIL→UPLD) prepares the fixture for a software update.

Lamp power and reset shortcuts

The control panel buttons can be used to control lamp power and reset the fixture.

- To strike the lamp, press [Enter] and [Up].
- To douse the lamp, press [Enter] and [Down].
- To reset the fixture, press [Menu] and [Up].

LED signal readouts

Four LEDs next to the digital display give additional information about fixture status:

- Ready: fixture is ready for operation.
- DMX: fixture is receiving a valid DMX signal.
- Lamp: lamp is struck and lit.
- Service: fixture is in service mode (for service use only).

DMX control

The MAC 250 Wash is compatible with USITT DMX 512 controllers and can be added to a standard DMX data link.

This section briefly describes the DMX-controllable effects. See "*DMX protocol*" on page 26 for an overview of DMX control options.

DMX operating modes

The MAC 250 Wash has two DMX operating modes, 16-bit and 16-bit Extended. 16-bit mode uses 13 DMX channels and 16-bit Extended mode uses 19 DMX channels. 16-bit Extended mode provides more precise control of the dimmer, CMY mix, color filter and frost settings. All other functions are identical. The DMX mode is selected using the PSET option in the fixture's control panel (see "*Control menu*" on page 28).

Lamp power

LAMP-ON

Unless automatic lamp strike is enabled, lamp power remains off until a lamp-on command is sent from the controller.

Note: A peak of electric current that can be many times the operating current is drawn for an instant when striking a discharge lamp. Striking many lamps at once may cause a voltage drop large enough to prevent lamps from striking or draw enough current to trip circuit breakers. If sending lamp-on commands to multiple fixtures, program a sequence that strikes lamps one at a time at 5 second intervals.

LAMP-OFF

The lamp can be doused from the controller by sending the lamp-off command on channel 1 for 5 seconds.

Important! ***Once a lamp is doused, it cannot be restruck until it has cooled. This typically takes around 8 minutes.***

Note that the lamp-off command may be disabled using the DMX Lamp-Off personality setting (PERS→DLOF) in the fixture's control panel.

Effect position

RESET

If an effect loses its indexing and fails to move to programmed positions, the fixture can be reset from the controller by sending the "Reset" command on channel 1. Note that you can require a DMX reset command to be sent for 5 seconds before it is executed, or you can disable the DMX reset feature, using the.DMX Reset personality setting (PERS→DRES) in the fixture's control panel.

DIMMER / SHUTTER

The mechanical dimmer/shutter system provides full high-resolution dimming, "instant" open and blackout, random and variable strobe effects, and random and variable pulses in which the dimmer snaps open and slowly dims or snaps closed and slowly opens. Shutter, strobe, and pulse effects are selected on channel 1. The intensity level is selected on channel 2. 16-bit Extended mode provides fine tuning of the intensity level on channel 3.

COLOR

The color wheel can be scrolled continuously – allowing for split color effects – or in steps, and rotated randomly or continuously in both directions at different speeds. In 16-bit Extended mode, the color setting selected on channel 10 can be fine-tuned on channel 11.

PAN AND TILT

Head pan and tilt are controlled on channels:

- 8 - 11 in 16-bit mode
- 14 - 17 in 16-bit Extended mode

The main pan and tilt control channels set the first 8 bits (the most significant byte or MSB), and the fine channels set the second 8 bits (the least significant byte or LSB) of the 16-bit control byte. In other words, the fine channels fine-tune the positions set by the main channels.

Speed control

Speed of pan, tilt and effects is controlled on channels:

- 12 and 13 in 16-bit mode
- 18 and 19 in 16-bit Extended mode

TRACKING CONTROL

Tracking control for pan/tilt and the various effects is enabled by setting the speed channels to 0.

With tracking control, the speed at which effects fade from one scene or position to the next (cross-fade speed) is determined by the controller. The controller divides the move into steps and updates the fixture with small changes at the rate required to achieve the fade. The fixture “tracks” the changes and averages them with a digital filter algorithm to provide smooth movement.

VECTOR CONTROL

Alternatively, with vector control, effects movement speed is determined by the values selected on the speed channels. This makes it possible to modify the speed of cross-fades when using a controller that does not offer cross-fade speed control. Vector control also provides smoother movement, particularly at slow speeds, with controllers that send slow or irregular tracking updates.

When using vector control, the cross-fade time on the controller must be set to 0.

BLACKOUT

When “blackout while moving” is selected on the speed channels, the shutter closes when the effect moves to make the transition invisible. The shutter opens when the movement is complete.

PERSONALITY OVERRIDES

The following channels provide tracking values that allow you to override the pan/tilt speed personality setting (PTSP in the control menu)

- 12 in 16-bit mode
- 18 in 16-bit Extended mode

The following channels provide tracking values that allow you to override the shortcuts setting (PERS→SCUT in the control menu).

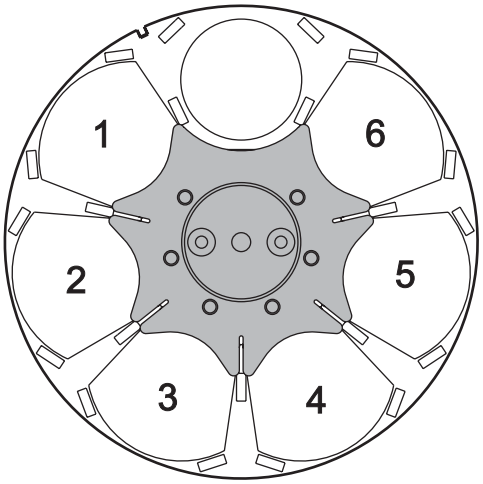
- 13 in 16-bit mode
- 19 in 16-bit Extended mode

Optics

Color filters

STANDARD CONFIGURATION

The MAC 250 Wash provides 6 dichroic color filters as shown below.



Position	Color
1	Blue 108
2	Green 206
3	Red 308
4	UV
5	Pink 312
6	CTC 5500 - 2900 K

Table 2: Standard colors

Figure 5: Color wheel (viewed from lamp side)

REPLACING A COLOR FILTER

Danger! ***Intense heat. Avoid contact by persons and materials. The exterior of the fixture can get very hot – up to 160° C (320° F). Disconnect the fixture from AC power and allow it to cool for at least 45 minutes before handling.***

Do not remove covers while the fixture is powered on as this exposes dangerous live electrical circuits, hot surfaces, and a lamp under high pressure.

1. Disconnect the fixture from AC power and allow it to cool.
2. The top and bottom covers look the same, but the top cover can be identified by checking that the text on the back of the head is oriented correctly as illustrated in Figure 6. Remove the top cover using a flathead screwdriver to loosen the four quarter-turn screws.

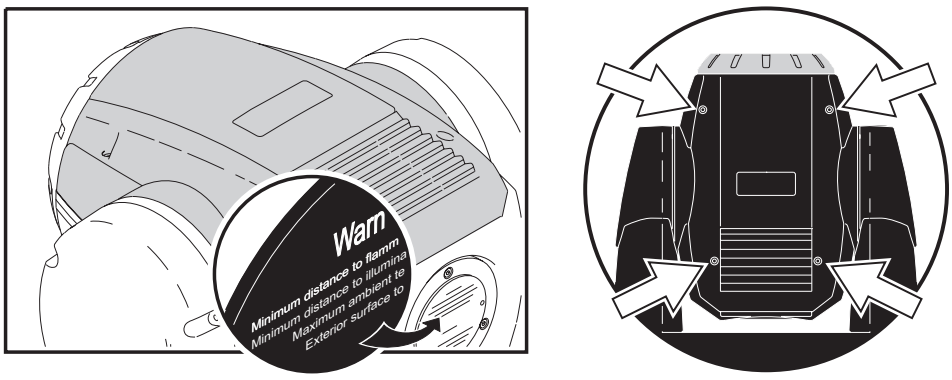


Figure 6: Identifying and removing the upper head cover

3. Put on clean lint-free gloves or use a clean lint-free cloth to avoid having to clean filters after handling.
4. Turn the color wheel to access the desired color filter. Press the filter away from the wheel slightly to release it from the retaining lugs (A) and then lift it out of the wheel (B) – see Figure 7.

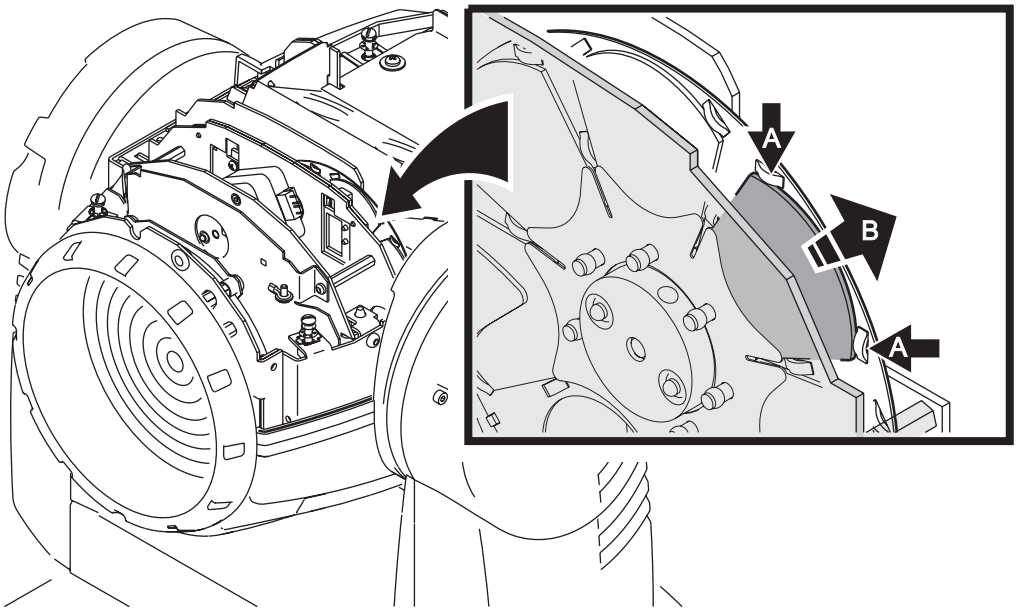
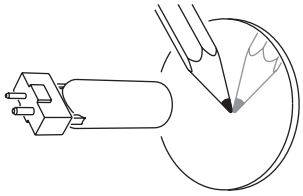


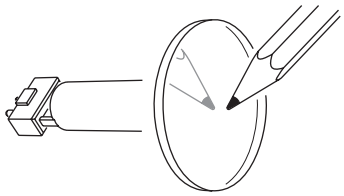
Figure 7: Color filter replacement

5. Color filters must be installed with the coated side facing towards the lamp as in Figure 8. To insert a color filter, slide it under the retention spring until it locates securely behind the lugs (A) on the color wheel. Clean the filter if necessary to ensure that it is perfectly free of oil or grease.



Coated side towards lamp

When an object is held up to the coated side, there is no space between the object and its reflection. The back edge of the filter cannot be seen when looking through the coated side.



Uncoated side away from lamp

When an object is held up to the uncoated side, there is a space between the object and its reflection. The back edge of the filter can be seen when looking through the uncoated side.

Figure 8: Correct color filter orientation

6. Replace the top cover before applying power.

Installing the wide-angle lens

A 61.5° cutoff-angle wide-angle lens is supplied with the MAC 250 Wash, together with all items necessary to install it.

To install the wide-angle lens:

1. Disconnect the fixture from power and allow it to cool.
2. Set the tilt lock and remove top and bottom head covers.
3. See Figure 9. Prepare to hold the front lens assembly as it is released, then remove the four retaining screws and remove the assembly.
4. See Figure 10. Place the front lens assembly face down on a work surface. Remove the 4 screws from the lens clamps, then remove the clamps (A), the standard lens (B) and the 4 silicone tubes (C) from the lensholder ring (D).
5. Reassemble using the same screws but replacing the standard clamps, silicone tubes and lens with the extra items supplied with the MAC 250 Wash.

   Note that the smooth side of the lens must face towards the lamp, as shown in Figure 10. Make sure that the lens is centered and sits flat on the lensholder ring (D). Tighten screws enough to compress the silicone tubes and hold the lens firmly, as shown in Figure 11.
6. Reinstall the lens assembly in the head, reinstall the covers and release the tilt lock before applying power.

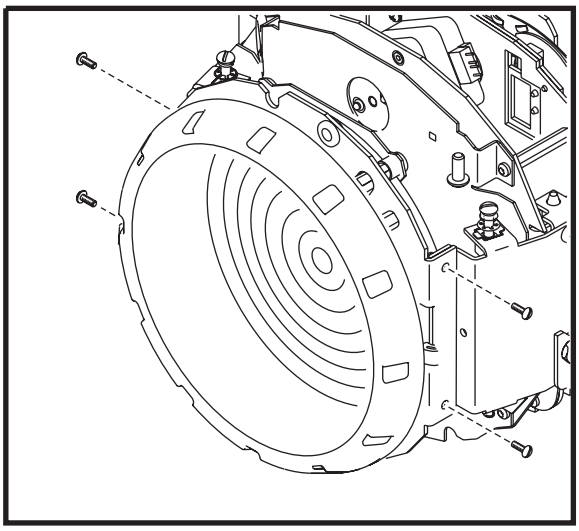


Figure 9: Removing the front lens

.

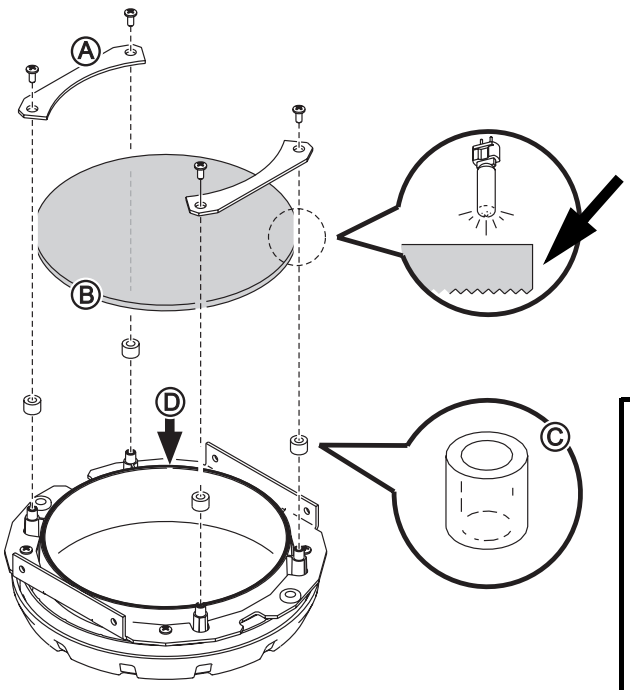


Figure 10: Lens retaining assembly

The textured side of the lens must face away from the lamp.

The lens must seat squarely in the lens ring (D). Tighten screws enough to compress the silicone tubes and hold the lens firmly.

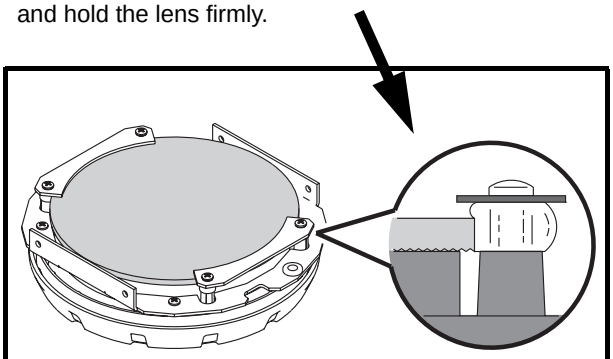


Figure 11: Securing the lens

Service

Warning! ***Read "Safety information" on page 5 before servicing the MAC 250 Wash. Disconnect the fixture from power and allow to cool for 45 minutes before handling or removing any cover. Refer any service operation not described here to a qualified service technician.***

Intense heat. Avoid contact by persons and materials. The exterior of the fixture can get very hot – up to 160° C (320° F). Disconnect the fixture from AC power and allow it to cool for at least 45 minutes before handling.

Do not remove covers while the fixture is powered on, as this exposes dangerous live electrical circuits, hot surfaces, and a lamp under high pressure.

The MAC 250 Wash requires regular maintenance to maintain peak performance.

It is Martin policy to use the best-quality materials and coatings available to ensure optimum performance and the longest possible component lifetimes. However, optical components in all lighting fixtures are subject to wear and tear over the life of the fixture, resulting in gradual changes in color rendition of dichroic filters or the specular properties of reflectors, for example.

The extent of wear and tear depends heavily on operating conditions, maintenance and environment, so it is impossible to specify precise lifetimes for optical components. However, you will eventually need to replace optical components if their characteristics are affected by wear and tear after an extended period of use and if you require fixtures to perform within very precise optical and color parameters.

As with electronic components in general, the MAC 250 Wash's PCBs are sensitive to ESD (electrostatic discharge). Take precautions to avoid ESD damage before opening the fixture. Service electronic components at a static-safe workstation only.

Cleaning guidelines

Important! ***Excessive dust, smoke fluid, and particle buildup degrades performance, causes overheating and will damage the fixture. Damage caused by inadequate cleaning or maintenance is not covered by the product warranty. To maximize the life of the MAC 250 Wash and protect the investment it represents, clean the fixture regularly – especially the cooling systems – following the guidelines in this section.***

Cleaning is vital. Excessive dust, grease, and smoke fluid buildup will degrade performance and cause overheating and damage that is not covered by the warranty. Cleaning schedules for lighting fixtures vary greatly depending on the operating environment. Cooling fans suck in airborne dust and smoke particles, and in extreme cases fixtures may require cleaning in less than 50 hours of operation. Environmental factors that may result in a need for frequent cleaning include:

- Use of smoke or fog machines.
- High airflow rates (near air conditioning vents, for example).
- Presence of cigarette smoke.
- Airborne dust (from stage effects, building structures and fittings or the natural environment, for example).

If one or more of these factors is present, inspect fixtures within their first 25 hours of operation to see whether cleaning is necessary. Check again at frequent intervals. This procedure will allow you to assess cleaning requirements in your particular situation. If in doubt, consult your Martin dealer about a suitable maintenance schedule.

Lamp replacement

Lamp life will vary. The rated life of a lamp is the average operating life before lamp failure in the manufacturer's test cycle. To reduce the risk of lamp explosion that will almost certainly damage the fixture, replace the lamp when it reaches the limit of its rated life. Never exceed a long-life lamp's rated life (3000 hours for the Philips MSD 250/2) by more than 10 percent.

For maximum lamp life, avoid excessive strikes and always allow the lamp to burn for at least 5 minutes before dousing it.

Replace the lamp when:

- it strikes with difficulty or not at all, is visibly deformed or is in any other way defective
- hours of use reach the manufacturer's "replace before" limit. See Table 3.

COMPATIBLE LAMPS

The MAC 250 Wash is supplied with a Philips MSD 250/2 lamp installed. Approved lamp options are shown in the table below. *Installing any other lamp may damage the fixture.*

Lamp	Average life	Color Temp.
Philips MSD 250/2	3000 hr	8500 K
Osram HSD 250/78	3000 hr	7800 K
GE CSD 250/2	3000 hr	9000 K

Table 3: Lamp comparison

INSTALLING A LAMP

Danger! ***Intense heat. Avoid contact by persons and materials. The exterior of the fixture can get very hot – up to 160° C (320° F). When replacing the lamp, disconnect the fixture from AC power and allow it to cool for at least 45 minutes before proceeding. Protect eyes and hands with safety goggles and gloves.***

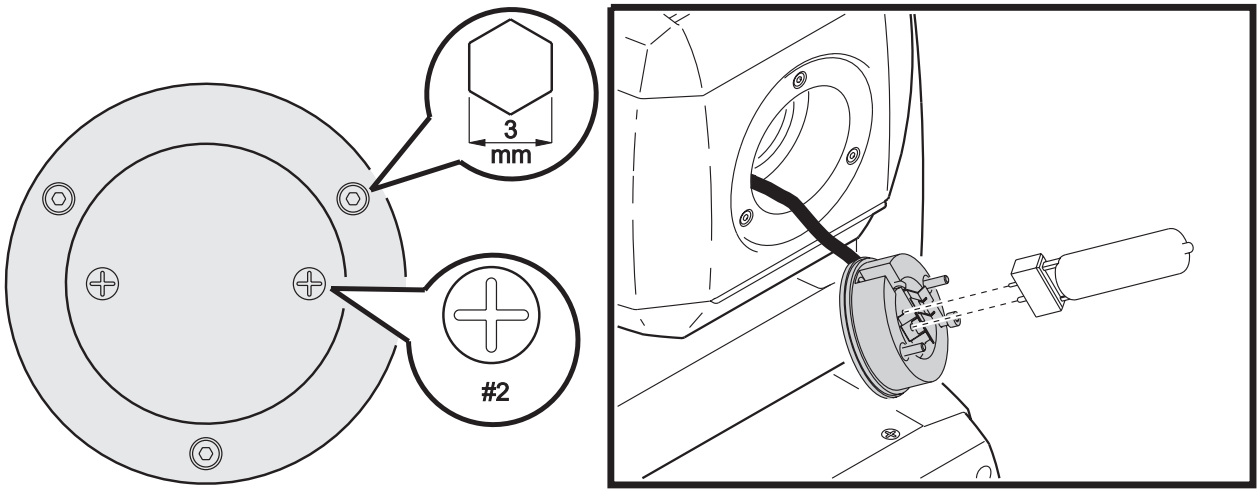


Figure 12: Lamp installation

1. Locate the lamp access cover at the back of the fixture head and remove the two Phillips screws.
2. Pull out the lamp socket.
3. If changing the lamp, remove the old lamp from the socket.
4. Holding the new lamp by its ceramic base (do not touch the glass), align the small pins on the lamp with the small holes in the socket and insert the lamp squarely. Make sure that the 4 small projections on the base contact the face of the socket.
5. Clean the glass bulb with the cloth supplied with the lamp, particularly if your fingers touched the glass. A clean, lint-free cloth wetted with alcohol may also be used.
6. Insert the lamp into the fixture with as little twist in the lamp wires as possible.

7. Align the screw holes and fasten the lamp access plate with 2 screws.
8. If installing a new lamp, reset the lamp hour and lamp strike counters as described on page 13.
9. Strike the lamp and adjust for optimum performance by turning the three 3mm Allen screws shown in Figure 12 one at a time until the brightest part of the beam is centered.
10. A hot-spot can be adjusted out with the three Allen screws. Turn the screws an equal amount to maintain lamp alignment.

Cleaning procedure

Use care when cleaning. The surface on dichroic filters is achieved by means of special multi-layer coatings and even small scratches may be visible. Residues from cleaning fluids can bake onto components and ruin them.

Remove smoke and other residues with cotton swabs or unscented tissues wetted with isopropyl alcohol 99.9%. A commercial glass cleaner may be used, but residues must be removed with distilled water. Clean with a slow circular motion from center to edge. Remove stuck particles with an unscented tissue or cotton swab soaked in alcohol. Do not rub the surface: lift particles off with a soft repeated press.

Rinse with distilled water. Mixing the water with a small amount of wetting agent such as Kodak Photoflo will help prevent streaking and spotting.

To clean the MAC 250 Wash:

1. Disconnect the fixture from power and allow the components to cool completely.
2. Use a vacuum and soft brush to remove any dust from the outside of the fixture and air vents.
3. Remove the head covers using a flathead screwdriver to loosen the four quarter-turn screws.
4. Release the air filter from the lower cover by hooking a fingertip under the edge of its clip and pulling up.
5. Clean the air filter with a vacuum or compressed air. If the filter is contaminated with smoke residue or other oily substances, soak and squeeze clean in a warm water/detergent solution, then blot dry. If the filter is not in perfect condition, replace with a new item, available from your Martin dealer.
6. Clean the twin fans in the head (see Figure 13) and the air vents in the head covers with a soft brush or cotton swab and vacuum.

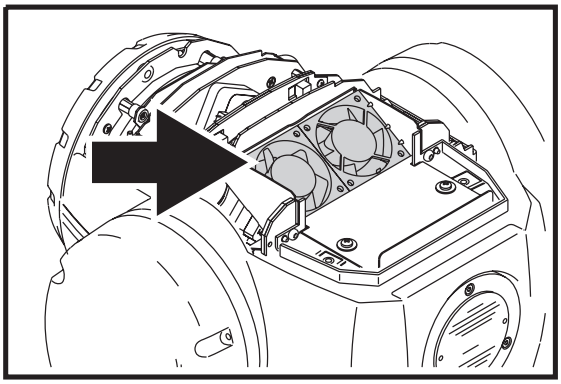


Figure 13: Head fans

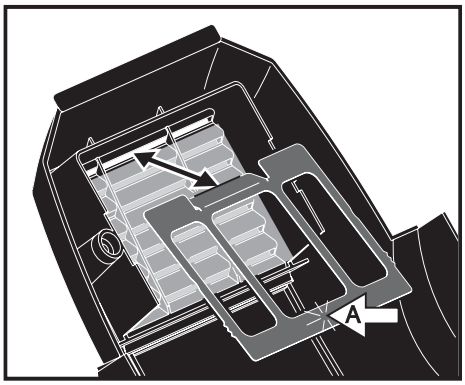


Figure 14: Refitting the air filter

7. Refit the air filter in the lower head cover by placing the filter in position, then hooking the tab on the filter clip under the last louver in the air vent and pressing the clip down onto the filter with a fingertip on (A) until secure (see Figure 14).
8. Carefully clean the optical components.
9. Dry with a clean, soft, lint-free cloth or compressed air.
10. Refit the head covers.

Important! ***The head cover with the air filter must be fitted over the head fans so that filtered air is sucked into the fixture.***

11. Remove the two 4mm Allen screws from the carrying handles on the sides of the base unit and remove the louvered side covers. Clean the cover louvers and base fan with a cotton swab or soft brush and vacuum.
12. Refit the base unit covers before reapplying power.

Lubrication

The MAC 250 Wash requires no lubrication under normal circumstances. Moving parts are treated with a long-lasting Teflon-based lubricant that can be reapplied by a Martin service partner in the unlikely event that this should be necessary.

Replacing fuses

MAIN FUSE

The main fuse holder is built into the mains input socket.

Warning! ***Always replace the fuse with one of the same type and rating!***

To replace the main fuse:

1. Unplug the mains cable from the input socket.
2. Pry open the fuse holder and remove the fuse.
3. Replace the fuse with one of the same type and rating. The fuse rating is listed on the serial number label.
4. Close the fuse holder and replace the mains cable.

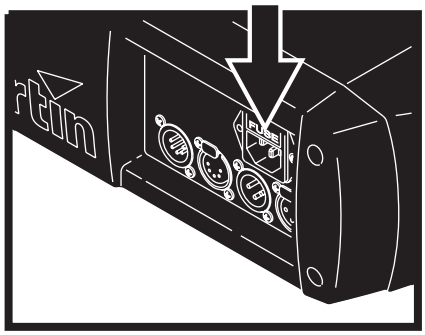


Figure 15: Main fuse holder

POWER SUPPLY FUSES

There are two fuses for the low-voltage power supplies located on the printed circuit board. If one or more of the green LEDs on the PCB does not light, one of these fuses may be blown. If all three LEDs are lit, the low-voltage power supplies are functioning correctly.

To replace the low-voltage fuses:

1. Disconnect the fixture from AC power.
2. Remove the left-side yoke cover (when looking at the head from the back with the text the correct way up as in Figure 16) to access the PCB.

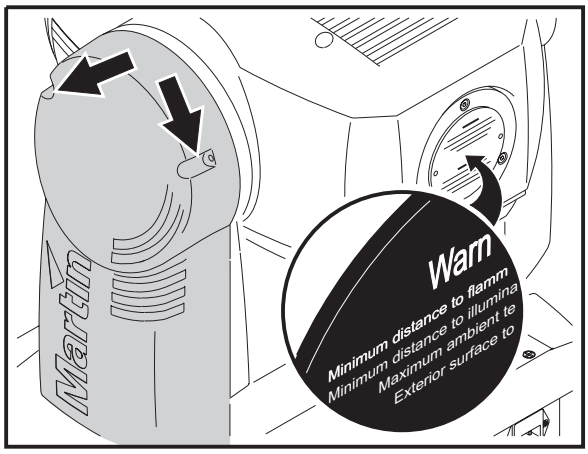


Figure 16: Identifying and removing the left-hand yoke cover

3. Carefully remove and check the two fuses located in the bottom of the PCB (see “*Circuit board connections*” on page 34). Replace as necessary with fuses of the same size and rating (see “*Fuses*” on page 37).
4. Re-attach the yoke cover.

If fuses blow repeatedly, have the fixture serviced by a Martin service technician.

Updating software

The latest MAC 250 Wash firmware is available from the support area of the Martin web site at http://www.martin.com. It can be installed via the DMX data link using a supported Martin uploader such as the MP-2, or via a LightJockey 4064 ISA DMX interface.

Note: Intermediate control systems such as the Martin Lighting Director (MLD) and the Martin Matrix must be bypassed when updating fixture software via the DMX link. These systems do not relay the update code correctly because it is not a DMX-compliant signal.

NORMAL UPDATE

To update fixture software, connect an upload device to the fixture just like a DMX controller and perform a DMX mode upload as described in the uploader’s documentation. There is no need to isolate the MAC 250 Wash from other types of fixtures on the DMX link.

After a software upload, when the MAC 250 Wash boots up it performs a check-sum test of the flash memory and then resets. If the firmware is corrupted, a check-sum error (CSER) occurs. A few seconds later the fixture displays UPLD and is ready for a new DMX-mode upload.

In the unlikely event that a software upload is interrupted, the fixture must be powered off for at least 10 seconds to force the check-sum test. You can repeat the DMX-mode upload as soon as UPLD is displayed.

BOOT SECTOR UPDATE

If the normal update procedure fails or the software update notes call for a boot-sector update, install new software as follows:

1. Disconnect the fixture from AC power.
2. Remove the left-side yoke cover (see Figure 16) to access the PCB.
3. See “*Circuit board connections*” on page 34. The boot sector jumper is located next to the plug for the control panel data cable. Move the jumper to the Init setting. Check that the Flash Write jumper is in the Enable position.
4. Apply power and perform a boot-mode upload as described in the uploader manual.
5. Disconnect the fixture from AC power. Move the jumper back to the Lock setting.
6. Re-attach the yoke cover before reapplying power.

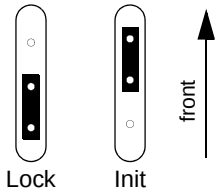


Figure 17: Boot sector jumper

The boot sector update can also be activated in the control panel menu under UTIL→UPLD

DMX protocol

Channel – 16 Bt (16-Bit Mode)	Channel – 16 Ex (16-bit Extended)	Value	Percent	Function
1	**1**	0 - 19 20 - 49 50 - 72 73 - 79 80 - 99 100 - 119 120 - 127 128 - 147 148 - 167 168 - 187 188 - 190 191 - 193 194 - 196 197 - 199 200 - 202 203 - 207 208 - 217 218 - 227 228 - 237 238 - 247 248 - 255	0 - 7 8 - 19 20 - 28 29 - 31 31 - 39 39 - 47 47 - 50 50 - 58 58 - 65 66 - 73 74 - 75 75 - 76 76 - 77 77 - 78 78 - 79 80 - 81 82 - 85 85 - 89 89 - 93 93 - 97 97 - 100	**Shutter, strobe, reset, lamp on/off** Shutter closed Shutter open Strobe, fast → slow Shutter open Opening pulse, fast → slow Closing pulse, fast → slow Shutter open Random strobe, fast Random strobe, medium Random strobe, slow Shutter open Random opening pulse, fast Random opening pulse, slow Random closing pulse, fast Random closing pulse, slow Shutter open Reset fixture (see notes a. and b. on left) Shutter open Lamp on Shutter open Lamp off (see note c. on left)
a. If DMX Reset is disabled in the control menu (PERS→DRES=OFF), the fixture can only be reset via DMX if all 3 CMY channels are set to a value from 230 - 232 (91%). b. A 5 second delay can be applied to the reset command from the control menu under PERS→DRES. c. If DMX Lamp Off is disabled in the control menu (PERS→DLOF=OFF), the lamp can only be doused via DMX if all 3 CMY channels are set to a value from 230 - 232 (91%).				
2	**2**	0 - 255	0 - 100	**Dimmer** Closed → open
-	**3**	0 - 255	0 - 100	**Dimmer fine (Least Significant Byte)**
3	**4**	0 - 255 0 1 - 127 128 - 254 255	0 - 100 0 1 - 50 51 - 99 100	**Cyan** White → full cyan **Random CMY color** (when set on channel 6 in 16 bt or channel 10 in 16 ex) Normal (full range) Minimum cyan setting (127: full cyan) Maximum cyan setting (128: no cyan) Normal (full range)
-	**5**	0 - 255	0 - 100	**Cyan fine (Least Significant Byte)**
4	**6**	0 - 255 0 1 - 127 128 - 254 255	0 - 100 0 1 - 50 51 - 99 100	**Magenta** White → full magenta **Random CMY color** (when set on channel 6 in 16 bt or channel 10 in 16 ex) Normal (full range) Minimum magenta setting (127: full cyan) Maximum magenta setting (128: no cyan) Normal (full range)
-	**7**	0 - 255	0 - 100	**Magenta fine (Least Significant Byte)**
5	**8**	0 - 255 0 1 - 127 128 - 254 255	0 - 100 0 1 - 50 51 - 99 100	**Yellow** White → full yellow **Random CMY color** (when set on channel 6 in 16 bt or channel 10 in 16 ex) Normal (full range) Minimum yellow setting (127: full cyan) Maximum yellow setting (128: no cyan) Normal (full range)
-	**9**	0 - 255	0 - 100	**Yellow fine (Least Significant Byte)**

				Color wheel scroll and rotation, random CMY
		0 - 179	0 - 70	**Continuous scroll – full color positions**
		0	0	White
		26	10	CTC 5500-2900 K
		51	20	Pink 312
		77	30	UV
		102	40	Red 308
		128	50	Green 206
		153	60	Blue 108
				Stepped scroll
		180 - 183	71 - 72	Blue 108
		184 - 187	72 - 73	Green 206
		188 - 191	74 - 75	Red 308
6	**10**	192 - 195	75 - 76	UV
		196 - 199	77 - 78	Pink 312
		200 - 203	78 - 79	CTC 5500-2900 K
		204 - 207	80 - 81	White
				Continuous rotation
		208 - 226	82 - 88	Clockwise, fast → slow
		227 - 245	89 - 96	Counterclockwise, slow → fast
				Random CMY color (set min. & max. CMY levels on channels 3, 4 & 5 in 16 bt and channels 4, 6 & 8 in 16 ex. modes)
		246 - 248	97	Fast
		249 - 251	98	Medium
		252 - 255	99 - 100	Slow
-	**11**	0 - 255	0 - 100	**Color fine (Least Significant Byte)**
7	**12**	0 - 255	0 - 100	**Frost filter** Open (off) → full
-	**13**	0 - 255	0 - 100	**Frost filter fine (Least Significant Byte)**
8	**14**	0 - 255	0 - 100	**Pan** Left → right (128 = neutral)
9	**15**	0 - 255	0 - 100	**Pan fine (Least Significant Byte)**
10	**16**	0 - 255	0 - 100	**Tilt** Up → down (128 = neutral)
11	**17**	0 - 255	0 - 100	**Tilt fine (Least Significant Byte)**
12	**18**	0 - 2	0 - 1	**Pan/tilt speed** Tracking
		3 - 245	1 - 96	Fast → slow
		246 - 248	97	Tracking, PTSP NORM (overrides control menu)
		249 - 251	98	Tracking, PTSP FAST (overrides control menu)
		252 - 255	99 - 100	Blackout while moving
13	**19**			**Effects speed**
				Dimmer, CMY filters
		0 - 2	0 - 1	Tracking mode
		3 - 245	1 - 96	Vector speed, fast → slow
		246 - 248	97	Tracking, SCUT OFF (overrides control menu)
		249 - 251	98	Tracking, SCUT ON (overrides control menu)
		252 - 255	99 - 100	Vector speed, fast
				Color wheel
		0 - 2	0 - 1	Tracking mode
		3 - 245	1 - 96	Vector speed, fast → slow
		246 - 248	97	Tracking, SCUT OFF (overrides control menu)
		249 - 251	98	Tracking, SCUT ON (overrides control menu)
		252 - 255	99 - 100	Blackout while moving
				Frost
		0 - 2	0 - 1	Tracking mode
		3 - 245	1 - 96	Vector speed, fast → slow
		246 - 251	97 - 98	Tracking
		252 - 255	99 - 100	Vector speed, fast

Control menu

Factory default settings are shown in bold type.

Menu	Item	Options	Notes (default settings in bold print)
ADDR		1-499 (16-bit mode) 1 - 493 (16-bit Extended mode)	DMX address (default address = 1)
PSET		16BT	**16-bit**
		16Ex	16-bit Extended
PATI	SWAP	ON	Map DMX pan control to tilt channel and vice versa.
		OFF	**Normal pan and tilt control**
	PINV	ON	Reverse DMX pan control, right → left
		OFF	**Normal pan control, left → right**
	TINV	ON	Reverse DMX tilt control, down → up
		OFF	**Normal tilt control, up → down**
PTSP		NORM	Normal pan/tilt speed
		FAST	**Maximum pan/tilt speed**
EFSP		NORM	Medium effects speed
		FAST	Fast effects speed
		PTSS	**Pan/tilt speed slave. Effects speed controlled by pan/tilt speed setting.**
STUD		OFF	**Optimize effects for speed**
		ON	Optimize effects for silence (studio mode).
PERS	DISP	ON	**Display remains on**
		2 MN	Display extinguishes 2 minutes after last key press
		10MN	Display extinguishes 10 minutes after last key press
	DINT	AUTO	**Automatic display dimming**
		10 - 100	Set display intensity manually
	DLOF	ON	Enable DMX lamp off command
		OFF	**Disable DMX lamp off command** (but allow DMX lamp off if all 3 CMY channels are set to a value from 230 - 232 / 91%)
	DRES	ON	**Enable DMX reset**
		OFF	Disable DMX reset (but allow DMX reset if all 3 CMY channels are set to a value from 230 - 232 / 91%)
		5SEC	Allow DMX reset if reset command sent for 5 seconds
	ALON	ON	Lamp strikes automatically within 90 seconds of power on
		OFF	**No automatic lamp strike**
		DMX	Lamp strikes if DMX is present, douses after 15 mins. if no DMX signal received
	SCUT	ON	**Effect wheels turn shortest distance**
		OFF	Effect wheels do not cross open position
	DICU	DIM1	Linear dimming curve
		DIM2	**Tungsten dimming characteristics**
	CMYB	ON	CMY blackout after shutter closed for 3 seconds
		OFF	**No CMY blackout**

Table 4: Control menu

DFSE	FACT	LOAD	Return all personality settings (not calibrations) to factory defaults
	CUS1	LOAD	Load custom configuration 1
		SAVE	Save custom configuration 1
	CUS2	LOAD	Load custom configuration 2
		SAVE	Save custom configuration 2
	CUS3	LOAD	Load custom configuration 3
		SAVE	Save custom configuration 3
INFO	TIME→HRS	TOTL	Total hours of operation with power on since manufacture
		RSET	Hours of operation since counter reset. To reset, display counter and press [Up] for 5 seconds.
	TIME→L HR	TOTL	Total hours of operation with lamp on since manufacture.
		RSET	Hours of lamp operation since counter reset. To reset, display counter and press [Up] for 5 seconds.
	TIME→L ST	TOTL	Total number of lamp strikes since manufacture.
		RSET	Number of lamp strikes since counter reset. To reset, display counter and press [Up] for 5 seconds.
	TEMP	HEAD	Head temperature
		BASE	Base Temperature
	VERS	X.X.X	CPU firmware version
DMXL		RATE	DMX packets per second
		QUAL	Percentage of data received without errors
		STCO	Decimal value of the DMX start code.
		SHUT	Shutter value
		DIM	Dimmer value
		CYAN	Cyan value
		MAG	Magenta value
		YEL	Yellow value
		COL	Color wheel value
		FROS	Frost filter value
		PANC	Coarse pan value
		PANF	Fine pan value
		TILC	Coarse tilt value
		TILF	Fine tilt value
		PTSP	Pan/tilt speed value
		EFSP	Effect speed value

Table 4: Control menu

MAN	RST		Reset fixture
	L ON		Lamp on
	LOFF		Lamp off
	SHUT	OPEN	Open shutter
		CLOS	Close shutter
		STRF	Fast strobe
		STRM	Medium strobe
		STRS	Slow strobe
	DIM	255-0	Dimmer
	CYAN	0-255	Cyan
	MAG	0-255	Magenta
	YEL	0-255	Yellow
	COL	OPEN	Color wheel in open position
		C 1→C6	Color wheel positions 1 → 6
		CW F	Clockwise rotation - fast
		CCWF	Counter-clockwise rotation - fast
		CW M	Clockwise rotation - medium
		CCWM	Counter-clockwise rotation - medium
		CW S	Clockwise rotation - slow
		CCWS	Counter-clockwise rotation - slow
		RNDF	Random CMY color - fast
		RNDM	Random CMY color - medium
		RNDS	Random CMY color - slow
	FRO	0-255	Frost filter
	PAN	0-255	Pan left → right
	TILT	0-255	Tilt up → down
TSEQ		RUN	Run a general test of all effects
UTIL (Press and hold [Enter] for 3 secs. to access)	FEDA	ON	**Enable pan/tilt position correction**
		OFF	Disable pan/tilt position correction
	EFFB	ON	**Enable color wheel position correction**
		OFF	Disable color wheel position correction
	ADJ		See “*Adjustment submenu*” on page 31
	CAL	P OF	Pan offset (1-255)
		T OF	Tilt offset (1-255)
		D OF	Dimmer offset (1-255)
		COOF	Color wheel offset (1-255)
		C OF	Cyan offset (1-255)
		M OF	Magenta offset (1-255)
		Y OF	Yellow offset (1-255)
	DFOF	SURE	Return all offsets to the default settings
	PCBT	SURE	PCB test – for service use only
	FANS	FULL	**Fans run at full speed**
		REG	Fans run at thermostatically regulated speed
	UPLD	SURE	Manually set fixture to software update mode

Table 4: Control menu

Adjustment submenu

This menu is accessed in UTIL→ADJ. Factory default settings are shown in bold type.

Menu	Item	Options	Notes (Default settings in bold print)
RST			Reset fixture
L ON			Strike lamp
LOFF			Douse lamp
HEAD	TOOL		Send effects to position for mechanical adjustment
	DIM	ADJ	Send dimmer to position for mechanical adjustment
		CLOS	Close dimmer
		OPEN	Open dimmer
		STRS	Strobe slow
		STRM	Strobe medium
		STRF	Strobe fast
	CYAN	ON S	Position magnet at sensor on cyan effect
		MIN	Minimum cyan position
		MAX	Maximum cyan position
	MAG	ON S	Position magnet at sensor on magenta effect
		MIN	Minimum magenta position
		MAX	Maximum magenta position
	YEL	ON S	Position magnet at sensor on yellow effect
		MIN	Minimum yellow position
		MAX	Maximum yellow position
	COL	ON S	Position magnet at sensor on yellow effect
		OPEN	Color wheel indexed at open position
		COL 1 –COL6	Color wheel indexed at full color positions
		CW S	Clockwise rotation, slow
		CW M	Clockwise rotation, medium
		CW F	Clockwise rotation, fast
	FRST	ADJ	Send frost effect to position for mechanical adjustment
		CLOS	Close frost effect (full frost)
		OPEN	Open frost effect (zero frost)
	TEST		Mechanical adjustments self test
PATI		NEUT	Pan and tilt neutral
		PNTD	Pan neutral, tilt down
		PNTU	Pan neutral, tilt up
		PLTN	Pan left, tilt neutral
		PRTN	Pan right, tilt neutral
		PLTD	Pan left, tilt down
		PRTU	Pan right, tilt down

Table 5: Adjustment submenu

Control panel shortcuts

- To strike the lamp, press [Enter] and [Up].
- To douse the lamp, press [Enter] and [Down].
- To reset the fixture, press [Menu] and [Up].

Error messages

Display readout	Appears if...	What to do
8.8.8.8	...there is no communication between the control panel and motherboard (this display appears briefly when switching on the fixture).	• Check fuses. • Check cable between control panel and motherboard. • Reinstall software. • Contact service technician.
MERR	...the EEPROM memory cannot be read.	• Contact service technician.
DPER	...a display programming error occurs due to contaminated upload data.	• Repeat upload procedure. • Contact service technician if problem persists.
DRER	...there is a drive current error.	• Contact service technician.
RCER	...there is a real-time clock error.	• Contact service technician.
COER	...the magnetic-indexing circuit malfunctions (e.g. sensor defective or magnet missing). After a time-out, the color wheel stops in a random position	• Contact service technician.
CYER	...there is a cyan feedback error.	• Contact service technician.
MAER	...there is a magenta feedback error.	• Contact service technician.
YEER	...there is a yellow feedback error.	• Contact service technician.
PAER	...there is a pan error and the sensor cannot find the pan index point. After a time-out, the fixture stops in a random position.	• Contact service technician.
TIER	...there is a tilt error and the sensor cannot find the tilt index point. After a time-out, the fixture stops in a random position.	• Contact service technician.
FBER	...there is a pan/tilt feedback error.	• Contact service technician.
FBEP	...there is a pan feedback error.	• Contact service technician.
FBET	...there is a tilt feedback error.	• Contact service technician.
HOT	...the lamp is too hot to restrike.	• Allow lamp to cool (typically for about 8 minutes).
LERR	...the lamp cannot be struck.	• Replace lamp.
L 1ER	...a light sensor error occurs.	• Contact service technician.
HTCO	...the head temperature cutoff is activated.	• Allow fixture to cool. • Clean fans, air filter and air vents. • Contact service technician if problem persists.
SHER	...there is a short-circuit and the lamp strikes without a command.	• Contact service technician.
HTER	...the head temperature sensor malfunctions.	• Contact service technician.
BTER	...the base unit temperature sensor malfunctions.	• Contact service technician.
NIE	...a CPU error occurs (NIE = non-maskable interrupt error) .	• Reset fixture • Upload new software • Contact service technician

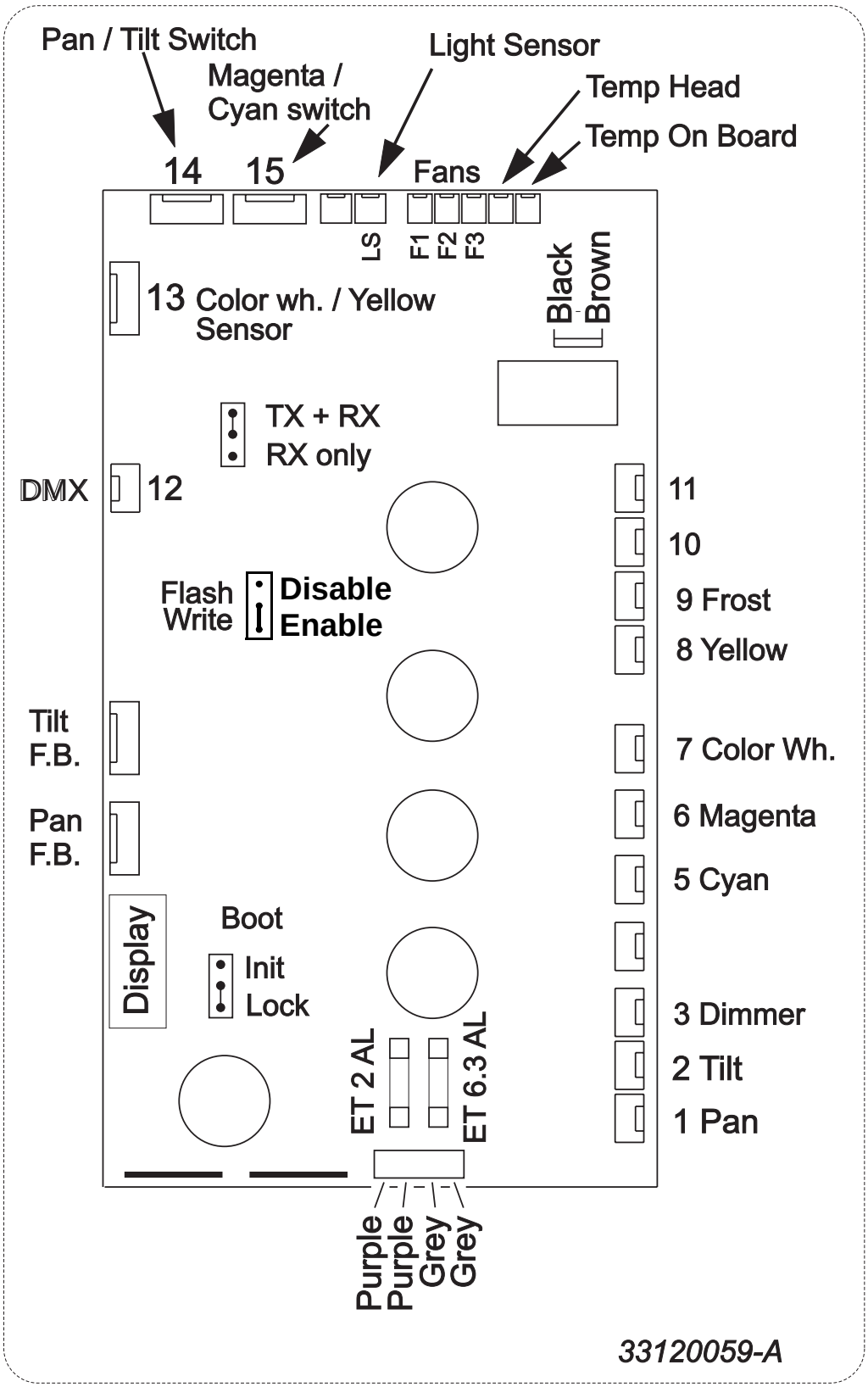
Table 6: Error messages

Troubleshooting

Problem	Probable cause(s)	Remedy
One or more of the fixtures is completely dead.	No power to fixture.	• Check that power is switched on and cables are plugged in.
	Primary fuse blown.	• Replace fuse.
	Secondary fuse(s) blown (located on PCB inside base).	• Check fuses on PCB and replace.
Fixtures reset correctly but all respond erratically or not at all to the controller.	The controller is not connected.	• Check connections.
	XLR pin-out of the controller does not match pin-out of the first fixture on the link (i.e. signal is reversed).	• Install a phase-reversing cable between the controller and the first fixture on the link.
Fixtures reset correctly but some respond erratically or not at all to the controller.	Poor data quality	• Check data quality (page 13). If much under 100 percent, the problem may be a bad data link connection, poor quality or broken cabling, missing termination, or a defective fixture disturbing the link.
	Bad data link connection	• Inspect connections and cables. Correct poor connections. Repair or replace damaged cables.
	Data link not terminated with 120 ohm termination plug.	• Insert termination plug in output jack of the last fixture on the link.
	Incorrect addressing of the fixtures.	• Check address setting.
	One of the fixtures is defective and disturbs data transmission on the link.	• Bypass one fixture at a time (unplug both connectors and connect them directly together) until normal operation is regained. Have the defective fixture serviced by a qualified technician.
	XLR pin-out on fixtures does not match (pins 2 and 3 reversed).	• Install a phase-reversing cable between the fixtures or swap pins 2 and 3 in the fixture that behaves erratically.
No light and LERR error message displayed.	The power supply settings do not match local AC voltage and frequency.	• Disconnect fixture. Check settings (“*AC power*” on page 7) and correct if necessary.
	Lamp missing or blown	• Disconnect fixture and replace lamp.
Lamp cuts out intermittently.	Fixture is too hot.	• Allow fixture to cool. • Clean fans, air filter and air vents. • Ensure that ambient temperature (Ta) does not exceed 40° C (104° F).
	The power supply settings do not match local AC voltage and frequency.	• Disconnect fixture. Check settings (“*AC power*” on page 7) and correct if necessary.

Table 7: Troubleshooting

Circuit board connections



MAC 250 Wash™ Specifications

PHYSICAL

Base length	375 mm (14.8 in.)
Base width	315 mm (12.4 in.)
Yoke width	393 mm (15.5 in.)
Height	538 mm (21.2 in.)
Weight	22.9 kg (50.4 lbs)

SOURCE

Lamp	250 W discharge
Base	GY 9.5
Approved models:	
Philips MSD 250/2 (installed as standard)	3000 hr, 8500 K, 250 W
Osram HSD 250/78	3000 hr, 7800 K, 250 W
GE CSD 250/2	3000 hr, 9000 K, 250 W

DYNAMIC EFFECTS

Color mixing	CMY, independently variable 0 - 100%
Color wheel	6 interchangeable filters (incl. UV transmitter and CTC) + open, indexing, continous rotation
Mechanical dimmer	0 - 100%
Shutter	Strobe effect up to 14 Hz, pulse effects, instant open and blackout
Diffuser	Variable frost filter
Pan	540°
Tilt	257°

CONTROL AND PROGRAMMING

DMX channels	13/19
Setting and addressing	Control panel with LED display
16-bit control	CMY, color wheel, dimmer, frost, pan and tilt
Movement control options	Tracking and vector
Protocol	USITT DMX512/1990
Receiver	Opto-isolated RS-485
Firmware update	Serial upload via DMX link

PHOTOMETRICS

MAC 250 Wash standard

Total output	7700 lumens
One-tenth peak output	6800 lumens
Half-peak output	3100 lumens
Cutoff angle	25.9°
One-tenth peak angle	19.1°
Half-peak angle	9.1°
Measurement conditions	226 V, 50 Hz; no effects applied
Measurement source	Philips MSD 250/2

MAC 250 Wash standard with frost

Total output . . . . . .4800 lumens
One-tenth peak output . . . . . .4100 lumens
Half-peak output . . . . . .1900 lumens
Cutoff angle . . . . . .48.8°
One-tenth peak angle . . . . . .34.8°
Half-peak angle . . . . . .16.0°
Measurement conditions . . . . . 226 V, 50 Hz; with frost applied
Measurement source . . . . . Philips MSD 250/2

MAC 250 Wash wide-angle lens

Total output . . . . . .9100 lumens
One-tenth peak output . . . . . .8600 lumens
Half-peak output . . . . . .4900 lumens
Cutoff angle . . . . . .61.5°
One-tenth peak angle . . . . . .52.5°
Half-peak angle . . . . . .28.7°
Measurement conditions . . . . . .232 V, 50 Hz; no effects applied
Measurement source . . . . . Philips MSD 250/2

MAC 250 Wash wide-angle lens with frost

Total output . . . . . .5100 lumens
One-tenth peak output . . . . . .4700 lumens
Half-peak output . . . . . .2600 lumens
Cutoff angle . . . . . .77.9°
One-tenth peak angle . . . . . .65.6°
Half-peak angle . . . . . .34.7°
Measurement conditions . . . . . 232 V, 50 Hz; with frost applied
Measurement source . . . . . Philips MSD 250/2

CONNECTIONS

AC Power input . . . . . 3-pin IEC
Data input . . . . . .locking 3-pin and 5-pin XLR male sockets
Data output . . . . . locking 3-pin and 5-pin XLR female sockets
Data pinout . . . . . pin 1 shield, pin 2 cold (-), pin 3 hot (+)

THERMAL

Maximum ambient temperature (T_a) . . . . . 40° C (104° F)
Maximum surface temperature . . . . . 160° C (320° F)

AC POWER

Operating range . . . . . .100 - 250 V, 50/60 Hz
AC input . . . . . 3-prong IEC male socket

Typical power and current

100 V, 50 Hz . . . . . 319 W, 3.8 A, PF 0.83
100 V, 60 Hz . . . . . 317 W, 3.4 A, PF 0.93
120 V, 50 Hz . . . . . 320 W, 2.9 A, PF 0.91
120 V, 60 Hz . . . . . 314 W, 2.7 A, PF 0.96
208 V, 50 Hz . . . . . 320 W, 1.9 A, PF 0.81
208 V, 60 Hz . . . . . 319 W, 1.7 A, PF 0.92
230 V, 50 Hz . . . . . 323 W, 1.6 A, PF 0.89
230 V, 60 Hz . . . . . 326 W, 1.5 A, PF 0.95
250 V, 50 Hz . . . . . 326 W, 1.5 A, PF 0.89
250 V, 60 Hz . . . . . 325 W, 1.4 A, PF 0.96

V = volts, Hz = hertz, W = watts, A = amps, PF = power factor

Allow for a deviation of +/- 10% from typical figures listed above.

Measurements made at nominal voltage.

Fuses

Main fuse	6.3 A / 250 V, time-delay – P/N 05020020
Fuse F1	6.3 A / 250 V, time-delay – P/N 05020020
Fuse F2	2.0 A / 250 V, time-delay – P/N 05020009

ELECTROMECHANICAL EFFECTS

Cyan filter	0 - 100%
Magenta filter	0 - 100%
Yellow filter	0 - 100%
Color wheel	6 colors plus open and split positions
Dimmer	0 - 100%
Shutter	Variable from 0 - 14 flashes per second
Zoom diffuser	0° - 16°
Pan	540° in 0.013° steps
Tilt	257° in 0.007° steps

APPROVALS

EU EMC	EN 55 103-1, EN 55 015, EN 61 547
EU safety	EN 60598-2-17
US safety	ANSI/UL 1573
Canadian safety	CSA C22.2 NO 166

CONSTRUCTION

Housing	UV-resistant fiber-reinforced composite
Ingress protection factor	IP 20

INSTALLATION

Orientation	any
Minimum distance to combustible materials	0.1 m (4 in.)
Minimum distance to illuminated surfaces	0.5 m (20 in.)
Minimum center-to-center distance between MAC 250 Wash fixtures	410 mm (16.2 in.)

INCLUDED ITEMS

Philips MSD 250/2 lamp (installed)	P/N 97010114
Safety wire	P/N 62400327
T-bracket, MAC 250/300 1/4-turn (2 pcs.)	P/N 91602008
Mains cable, 3 m (9.8 ft), IEC 3-pin	P/N 11501013
Wide-angle lens	P/N 41600026
User manual	P/N 35000164

ACCESSORIES

Half-coupler clamp	P/N 91602005
G-clamp	P/N 91602003
Quick trigger clamp	P/N 91602007
Omega bracket	P/N 91602001
Safety wire, universal, 50 kg safe work load	P/N 91604003
DMX cable, STP, 1 pair + shield, IEC/UL-CL, 1 m	P/N 91611242
DMX cable, STP, 1 pair + shield, IEC/UL-CL, 2 m	P/N 91611243
DMX cable, STP, 1 pair + shield, IEC/UL-CL, 5 m	P/N 91611244
DMX cable, STP, 1 pair + shield, IEC/UL-CL, 10 m	P/N 91611245
DMX cable, STP, 1 pair + shield, IEC/UL-CL, 20 m	P/N 91611246
DMX termination plug, 3-pin male XLR	P/N 91613017
10 cm phase-reversing 3-pin male to 3-pin female XLR cable	P/N 11820006

RELATED ITEMS

Martin DABS1™ USB-XLR interface device and cables	P/N 91611144
Martin Universal USB-DMX Interface Box™	P/N 90702045

ORDERING INFORMATION

MAC 250 Wash™ (in cardboard box) . . . . . P/N 90225810
MAC 250 Wash™ (in flightcase) . . . . . P/N 90225800

Specifications subject to change without notice. For the latest product specifications, see www.martin.com

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